



## Setting Up Interconnection Regimes: References for Regulators<sup>1</sup>

November 22, 2002

This document provides a list of references designed for regulators in the midst of developing their interconnection regimes. The first section, "Significance of interconnection," offers general interconnection principles on which regions in the world have reached agreement. The second section, "Regulatory Framework," offers links to interconnection rules of individual countries. The third section lists some citations of interconnection agreements, some are reference or model agreements, others are actual agreements in force. This section also lists cites for information on dispute resolution mechanisms for individual regulators. The fourth section offers links to interconnection prices. The fifth section identifies mechanisms used by regulators to monitor compliance with interconnection agreements. The final section offers an example of an enforcement action against an operator that had not fulfilled its interconnection obligations.

### I. Significance of interconnection

When there is more than one operator in a market, interconnection between operators is essential for subscribers of one network to communicate with subscribers of another network. In an environment where one operator is significantly larger than the others and possesses individual market power, however, it may have little or no incentive to negotiate reasonable terms of interconnection with other carriers. Under such circumstances, therefore, it is necessary for the regulator to have a role in the interconnection regime.

*Reference materials- international statements:*

- **APEC Principles of Interconnection:**  
<http://www.apectelwg.org/apecdata/telwg/interTG/principi.html>  
General information on interconnection in APEC region:  
<http://www.apectelwg.org/apec/atwg/pritgtgr.html>
- **CITEL interconnection best practices:**  
<http://www.citel.oas.org/pcc1/guidelines/guidelines%20and%20practices.doc>

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<sup>1</sup> This paper supports the work of the Regional and Industry Analysis Branch of the FCC's International Bureau to encourage international discussion of interconnection and related issues. Other than the U.S. law and FCC Orders listed, the documents listed in this paper do not reflect the views of the FCC. For more information or to provide suggestions to this paper, please contact Irene Wu, [iwu@fcc.gov](mailto:iwu@fcc.gov), telephone: 1-202-418-1623.

- **European Union.** “Directive 2002/19/EC of the European Parliament and of the Council of 7 March 2002 on access to, and interconnection of, electronic communications networks and associated facilities (Access Directive).”  
[http://europa.eu.int/eur-lex/pri/en/oj/dat/2002/l\\_108/l\\_10820020424en00070020.pdf](http://europa.eu.int/eur-lex/pri/en/oj/dat/2002/l_108/l_10820020424en00070020.pdf)
- **WTO.** Basic Telecommunications Agreement. Reference Paper on Regulatory Principles. [http://www.wto.org/english/tratop\\_e/servte\\_e/tel23\\_e.htm](http://www.wto.org/english/tratop_e/servte_e/tel23_e.htm)

*Reference materials – international training materials:*

- Wright, Julian, and D. Mark Kennet. “Telecommunications Interconnection: a Literature Survey.” Prepared for Asia Pacific Economic Cooperation (APEC). This note provides a brief overview of the interconnection problem, issues of cost measurement, and common methods of interconnection pricing. Following this is a large sampling of literature from professional journals and regulatory agency publications that discusses interconnection between telecommunications networks. Each paper is reviewed and categorized for its relevance according to a set of guidelines laid down by representatives of the APEC economies.  
<http://www.apectelwg.org/apecdata/telwg/interTG/ATTZ2FG1.htm>
- APEC Telecommunications Working Group Training Workshop. July 30- August 1, 2002. Discusses interconnection negotiations, pricing, enforcement, and dispute resolution, among other issues. <http://interconnect.ovum.com/>

## **II. The regulatory framework for interconnection**

If operators can agree to interconnection agreements on their own, this is generally preferable to government intervention in the market. A good regulatory framework can increase the likelihood that operators will reach agreements on their own in a timely fashion. In the U.S., examples of operators reaching interconnection agreements on their own include agreements between wireless operators and agreement between Internet backbone providers. There are often times, however, when operators are unable to agree on the terms for interconnection. There are a variety of tools that regulators can use to create an environment that encourages the conclusion of interconnection agreements and to resolve disputes when they arise. These include

1. Publishing a reference interconnection agreement or the actual interconnection agreements previously negotiated, especially those negotiated with dominant operators in the market. This improves the quality of information available in the market on interconnection possibilities.
2. Setting a timeline for conclusion of an interconnection agreement, after which the regulator will intervene.

3. Establishing a set of default prices and other terms that will go into effect should the regulator intervene that are designed to encourage operators to conclude agreements of their own accord.
4. Requiring each of the operators in question to make a final best interconnection offer and then have the regulator choose one of them. This forces an operator with more market power to either make a reasonable offer or be forced to accept the other operator's demands. This option tends to work best where only a limited number of clearly defined issues are in dispute.
5. Regulators can also simply mandate certain rates and terms for interconnection as generally available to carriers.

*Reference materials – legislative mandate for interconnection:*

- **United States.** Communications Act of 1934. amended 1996. See especially Title II, Sec. 251.
- **France.** Telecommunications Act of 26 July 1996. [www.art-telecom.fr/textes/corps-ang.htm](http://www.art-telecom.fr/textes/corps-ang.htm) and [www.art-telecom.fr/textes/corps.htm](http://www.art-telecom.fr/textes/corps.htm) (French).
- **Hong Kong, China.** Telecommunications Ordinance (<http://www.justice.gov.hk/blis.nsf/e1bf50c09a33d3dc482564840019d2f4/fc7ef990d740c089c82564800040c259?OpenDocument>) with the Telecommunication (Amendment) Ordinance 2000 ([http://www.ofta.gov.hk/whats\\_new/to-amend-2000-eng.pdf](http://www.ofta.gov.hk/whats_new/to-amend-2000-eng.pdf))
- **Singapore.** Info-communications Development Authority of Singapore Act 1999 ([www.ida.gov.sg](http://www.ida.gov.sg), "Policy & Regulation" -> "Legislation"; Second Schedule, Sec. 7(1))
- **Spain.** Telecommunications Law, Articles 22-29. Ley 11/1998, de 24 de abril, General de Telecomunicaciones. [www.cmt.es](http://www.cmt.es), under "Centro de información" under "Legislacion."

*Reference materials- administrative rules:*

- **Argentina.** Interconnection regulation, from 2000. <http://www.secom.gov.ar/normativa/d764-00/interconexion.htm>
- **Canada.** Canadian Radio-Television Commission. "Local Competition." Telecom Decision CRTC 97-8. May 1, 1997 <http://www.crtc.gc.ca/archive/ENG/Decisions/1997/DT97-8.HTM>
- **Hong Kong, China.** Office of the Telecommunications Authority. "Review of the Telecommunications Authority's Statements No. 4, 5, 6, 7 (Revised) and 8 on

Interconnection and Related Competition Issues.” Statement of the Telecommunications Authority. March 18, 2002.  
[http://www.ofta.gov.hk/frameset/documents\\_index\\_eng.html](http://www.ofta.gov.hk/frameset/documents_index_eng.html)

- **United States.** Federal Communications Commission. “In the Matter of Implementation of the Local Competition Provisions in the Telecommunications Act of 1996 and Interconnection between Local Exchange Carriers and Commercial Mobile Radio Service Providers.” Released August 8, 1996.  
[http://www.fcc.gov/Bureaus/Common\\_Carrier/Orders/1996/fcc96325.pdf](http://www.fcc.gov/Bureaus/Common_Carrier/Orders/1996/fcc96325.pdf)
- **United States.** Federal Communications Commission. “In the Matter of Developing a Unified Intercarrier Compensation Regime.” CC Docket No. 01-02. Released April 27, 2001. This Notice of Proposed Rulemaking discusses and seeks comment on alternative approaches to interconnection pricing, including “bill and keep.”  
[http://ftp.fcc.gov/Bureaus/Common\\_Carrier/Orders/2001/fcc01132.doc](http://ftp.fcc.gov/Bureaus/Common_Carrier/Orders/2001/fcc01132.doc)

### **III. Interconnection agreements – technical conditions**

There are typically two key aspects of interconnection agreements, the technical conditions and the pricing conditions.

Because incumbents lack incentive to interconnect, regulators may need to mandate the technical aspects of interconnection, upon which other carriers will depend. For example, the regulatory may need to set deadlines within which the incumbent must respond to a request for interconnection and provide the actual interconnection facilities. Similarly, the regulator may need to require the incumbent to make space available within its central offices so that other carriers can install their equipment necessary for physical interconnection.

Below are listed some agreements as examples of how different regimes have approached interconnection.

*Reference- general:*

- “Globalization of Interconnection.” International Engineering Consortium. A short, basic introduction to the technical issues related to interconnection.  
[www.iec.org/online/tutorials/global\\_interconnect/](http://www.iec.org/online/tutorials/global_interconnect/)

*Reference – reference agreements posted by governments and/or regulatory bodies:*

- **Canada.** Model Tariff. September 2002.  
<http://www.crtc.gc.ca/cisc/eng/cisf3g5.htm>
- **European Union members.** Reference Interconnect Offerings.  
[www.analysys.com/atlas/news.asp?ids=10](http://www.analysys.com/atlas/news.asp?ids=10).

- **Singapore.** SingTel's reference interconnection agreement. <http://www.ida.gov.sg/Website/IDAContent.nsf/dd1521f1e79ecf3bc825682f0045a340/291eca20f80f8425c8256a160036af2f?OpenDocument>  
Alternatively, from the IDA homepage, follow the "Policy and Regulation", "Interconnection & Access", and "Reference Interconnection Offer" links.
- **United States.** New York State Public Service Commission makes interconnection agreements public. A list of agreements is available at [http://www.dps.state.ny.us/Interconnection\\_Agreements.htm](http://www.dps.state.ny.us/Interconnection_Agreements.htm).
- **United States.** A list of California interconnection agreements are available at <http://www.cpuc.ca.gov/static/industry/telco/current+information/ordering+interconnection+agreements/index.htm>
- **United States.** Illinois Commerce Commission has interconnection agreements available to download from their website. <http://www.icc.state.il.us/icc/tc/tcIa.asp>

*Reference – reference agreements posted by incumbent carriers:*

- **France.** France Telecom. <http://www.francetelecom.com/vfrance/pdf/L33-1-2002.pdf>
- **Germany.** Deutsche Telekom [http://www.telekom.de/dtag/ipl1/cda/level3\\_a/0,3680,161,00.html](http://www.telekom.de/dtag/ipl1/cda/level3_a/0,3680,161,00.html)
- **Japan.** Guidebook for interconnection with NTT East. [http://www.ntt-east.co.jp/info-st/e/conguide/guidebook\\_EASTe/pdf-e/NTT\\_EASTe.pdf](http://www.ntt-east.co.jp/info-st/e/conguide/guidebook_EASTe/pdf-e/NTT_EASTe.pdf)
- **New Zealand.** Telecom New Zealand interconnect agreements. <http://www.telecom.co.nz/content/0,2502,200656-1553,00.html>
- **United Kingdom.** British Telecom. <http://www.btinterconnect.com/refoffer.htm>
- **United States.** Qwest. [www.qwest.com/wholesale/clecs/negotiations.htm](http://www.qwest.com/wholesale/clecs/negotiations.htm).

*Reference – collocation rules:*

- **United States.** "In the Matter of Deployment of Wireline Services Offering Advanced Telecommunications Capability." FCC 01-204. August 8, 2001. [http://www.fcc.gov/Bureaus/Common\\_Carrier/Orders/2001/fcc01204.pdf](http://www.fcc.gov/Bureaus/Common_Carrier/Orders/2001/fcc01204.pdf)

*Reference – dispute resolution rules:*

- **Australia.** "Resolution of telecommunications access disputes – a draft guide." 2002. Australian Consumer and Competition Commission. [www.accc.gov.au/telco/disp\\_res/resolution.htm](http://www.accc.gov.au/telco/disp_res/resolution.htm)

- **United Kingdom.** “Requesting the Director General of Telecommunications to resolve an interconnection dispute: guidance for the telecommunications industry.” November 2001. Office of Telecommunications, United Kingdom. [http://www.oftel.gov.uk/publications/ind\\_guidelines/disp1101.htm](http://www.oftel.gov.uk/publications/ind_guidelines/disp1101.htm)
- **United States.** California Public Utilities Commission’s rules for mediation and arbitration of interconnection are available at [http://www.cpuc.ca.gov/PUBLISHED/FINAL\\_RESOLUTION/2853.htm](http://www.cpuc.ca.gov/PUBLISHED/FINAL_RESOLUTION/2853.htm)

*Reference – dispute resolution cases:*

- **United Kingdom.** Enforcement of interconnection obligation. “Interconnection with BT’s ATM Network. June 14, 2002. <http://www.oftel.gov.uk/publications/broadband/dsl/atmi0602.htm>
- **United States.** Texas Public Utilities Commission. The major documents on interconnection dispute resolution, before and after agreements have been reached are available at <http://www.puc.state.tx.us/telecomm/interconn/index.cfm>

#### **IV. Interconnection agreements – pricing conditions**

If the regulator decides it is necessary for the regulator to set prices, there are a variety of strategies that can be deployed.

1. Best practices approach. A regulator can look at a set of prices used in other telecommunications markets and develop benchmarks based on the experiences of others.
2. Cost model approach. A regulator can study the costs involved in interconnection and make a determination on what prices are appropriate for interconnection. There are basically two kinds of cost approaches:
  - historical approach. Historical cost approaches use those costs an operator actually used to build a network.
  - forward-looking economic cost approach. Forward-looking costs are those costs an operator would use to build a comparable network today.

Most economists agree that a forward-looking cost approach contributes to an interconnection regime that will be more efficient in the future, while a historic cost approach tends to introduce the inefficiencies of an incumbent operator into future development.

Among forward-looking economic cost approaches, there are

- top-down financial/accounting models, which start with an incumbent’s actual investment and attempt to make adjustments to reflect a forward-looking approach and
- bottom-up engineering approaches, which design a forward looking network without reference to any existing network facilities.

*Reference- pricing:*

- **European Union.** Member countries interconnection tariffs.  
<http://www.analysys.com/atlas/Series/Default.asp>
- **Germany.** RegTP current rates.  
<http://www.regtp.de/aktuelles/02285/01/index.html>
- **Organization of Economic Development and Cooperation (OECD).** “The Practice of Access Pricing in Telecommunications.” Directorate for Financial, Fiscal, and Enterprise Affairs, Competition Committee. DAFFE/COMP/WP2(2002). Discusses pricing of access services in OECD member countries. [check website]
- **United States.** A list of rates set for unbundled network elements for New York is available at [http://www.dps.state.ny.us/UNE\\_Rates.htm](http://www.dps.state.ny.us/UNE_Rates.htm)
- **United States.** “A Survey of Unbundled Network Element Prices in U.S.” by Billy Jack Gregg. July 2002. [www.nrri.ohio-state.edu/programs/telecommunications.html](http://www.nrri.ohio-state.edu/programs/telecommunications.html)
- **United States.** The Federal Communications Commission’s Electronic Tariff Filing System is an Internet based system through which incumbent Local Exchange Carriers must submit official tariffs. Click “Public Access” to view information. <http://svartifoss2.fcc.gov/prod/ccb/etfs/>. For a direct link to tariff filings. <http://svartifoss2.fcc.gov/cgi-bin/ws.exe/prod/ccb/etfs/webpublic/selectlec.htm>

*Reference – pricing models:*

- **United States.** Federal Communications Commission. Hybrid Cost-Proxy Model. <http://www.fcc.gov/wcb/tapd/hcpm/welcome.html>
- **Germany.** RegTP Analytical Cost Model. <http://www.regtp.de/en/> under “Telecoms Regulation,” under “Analytical Cost Model.”

**V. Monitoring compliance with interconnection agreements**

Once interconnection agreements are reached, frequently there can be problems with operator compliance. Issues that may arise include

1. Delays in providing interconnection
  - a. Delayed response to request for interconnection orders
  - b. Once orders are acknowledged, delay in provisioning the interconnection
  - c. Preferential treatment of own affiliates’ requests over competitors’ requests
  - d. Refusal to provide adequate information concerning the network
2. Disputes over technical conditions

- a. Denying interconnection is possible at a requested point
- b. Demanding excessive compensation for network changes that may be required to provide interconnection or charging for changes not directly related to interconnection
- c. Denying to competitors physical access to networks, when required to provide service

### 3. Disputes over billing and settlements

There are a number of mechanisms that can ameliorate such problems. For example, requiring the incumbent carrier to provide interconnecting carriers with data on the types and amount of traffic exchanged may reduce billing disputes. Similarly, imposing performance measures and performance reporting requirements on the incumbent can help the regulator detect discrimination.

In the United States, the proposed approach is to identify a series of performance measures in the provision of interconnection. When operators fail to perform adequately, the proposal is for the regulator to take action against them. While still a proposal at the federal level, such measures have been implemented at the state level.

#### *Reference:*

- “Operations Support Systems (OSS).” International Engineering Consortium. A discussion of operations support systems that perform management, inventory, engineering, planning, and repair functions for communication service providers and their networks. <http://www.iec.org/online/tutorials/oss/>
- **United States.** A proposal to identify a number of national performance measurements and standards for evaluating the provision of unbundled network elements (UNEs) by incumbent local exchange carriers with the aim of providing greater consistency, certainty, and clarity in the marketplace. [http://www.fcc.gov/wcb/cpd/special\\_access/](http://www.fcc.gov/wcb/cpd/special_access/)
- **United States.** “Section 271 Compliance Monitoring of Southwestern Bell Telephone Company of Texas. Project Archive #20400.” Beginning in 2000, performance remedy plans issued by the Texas Public Utility Commission. [www.puc.state.tx.us/telecomm/projects/20400/20400arc/20400arc.cfm](http://www.puc.state.tx.us/telecomm/projects/20400/20400arc/20400arc.cfm)
- **United States.** “Verizon Performance Assurance Plan. Case 99-C-0949.” Beginning in 2002, performance assurance plans issued by the New York State Public Service Commission. [www.dps.state.ny.us/Case\\_99C949.htm](http://www.dps.state.ny.us/Case_99C949.htm)
- **United States.** Bell South performance results. <http://pmap.bellsouth.com/content/documentation.aspx>)



- **United States.** Qwest performance results.  
(<http://www.qwest.com/wholesale/results/>)

## **VI. Enforcement of interconnection agreements**

If the regulator determines that an operator has violated an interconnection agreement, there should be a mechanism to increase incentives to comply, sometimes by penalizing the operator. Common tools are to impose fines or other monetary penalties on operators who fail to comply with their interconnection agreements.

- **United States.** Federal Communications Commission Enforcement of regional Bell operating companies' local market opening requirements, including information on Bell Atlantic consent decree case.  
<http://www.fcc.gov/eb/LoTelComp/271.html>